

REMARKS

Independent claim 1 has been again amended to clarify its recitals in view of the rejections under 35 U.S.C. §112. Since this Amendment does not increase either the total number of claims or the number of independent claims, no additional fee is necessary.

Claims 1 (independent; amended) and 8, 11 and 14 (all dependent on claim 1) are in the application. No claim has been allowed.

Claim Rejections - 35 U.S.C. §112

§112, First Paragraph

Claim 1 (and dependent claims 8, 11 and 14) have been rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. This rejection is directed to the recital, introduced in applicants' last previous Amendment (filed October 18, 2011), that "the thickness of the anti-ultraviolet layer is 66.6 to 80% of the mean particle diameter of the microparticles."

Applicants' specification as originally filed states, e.g. at paragraph [0031] of patent application publication No. US 2009/0042017 (hereinafter "Pub. '017"), that "the thickness of the anti-ultraviolet layer ... is preferably a thickness corresponding to 20 to 80% ... of the mean particle diameter of the microparticles." This is an express written description of the upper limit (80%) of the claimed range.

Example 1 in applicants' specification as originally filed (Pub.'017 at paragraph [0038]) describes an example of the surface protective sheet of the claimed invention in which the thickness of the anti-ultraviolet layer when cured is 4 microns and the mean particle diameter of the spherical microparticles is 6 microns. Thus, in this Example, the anti-ultraviolet layer thickness is $4/6=66.67\%$ of the mean diameter of the microparticles, providing an express written description of the lower limit of the claimed range, 66.6%, which is within the broader 20-80% range described in paragraph [0031] of Pub. '017, discussed above.

Example 2 of the specification as originally filed (Pub. '017 at paragraph [0039]) describes another example of the claimed invention in which the thickness of the cured anti-

ultraviolet layer is 4 microns (same as Example 1) and the mean particle diameter of the spherical microparticles is 5 microns, so that the layer thickness is $4/5=80\%$ of the mean particle diameter, which is the upper limit of the broader 20-80% range of paragraph [0031].

In the Amendment introducing the "66.6-80%" recital to claim 1, Examples 1 and 2 were both cited as constituting support for this recital in the written description. The current Office Action, acknowledging (p. 3) that "The support for this amendment was from the example compositions," asserts that "the size range for the examples is for the specific resins, ultraviolet absorbers, microparticles and organopolysiloxane of the examples and this does not support the more broadly claimed composition of claim 1."

Applicants respectfully submit that this assertion is in error. In this regard, attention is directed to M.P.E.P. §2163.05 [R-2] III, which states, in pertinent part,

"With respect to changing numerical range limitations, the analysis must take into account which ranges one skilled in the art would consider inherently supported by the discussion in the original disclosure. In the decision in In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976), the ranges described in the original specification included a range of '25%-60%' and specific examples of '36%' and '50%.' A corresponding new claim limitation to 'at least 35%' did not meet the description requirement because the phrase 'at least' had no upper limit and caused the claim to read literally on embodiments outside the '25% to 60%' range, however a limitation to 'between 35% and 60%' did meet the description requirement."

In other words, a disclosure describing a broad range and a numerical example within the broad range may constitute a written description properly supporting a claim amendment reciting a range of which one limit is the numerical example and the other limit is an end point of the broader disclosed range. That is exactly the situation here.

Moreover, concerning the Examiner's contention (current Office Action, p. 3) that "the size range for the examples is for the specific resins, ultraviolet absorbers, microparticles and organopolysiloxane of the examples and this does not support the more broadly claimed composition of claim 1," it may be noted that the proportional relationship between the anti-ultraviolet layer thickness and the mean particle diameter of the spherical microparticles is

purely physical in its functional significance and has nothing to do with the chemical identity of the ingredients of the anti-ultraviolet layer. As applicants' specification explains (Pub. '017 at paragraph [0031]),

"When the thickness [of the anti-ultraviolet layer] is 20% or more of the mean particle diameter, exfoliation of the microparticles from the anti-ultraviolet layer can be prevented, and the anti-ultraviolet property and indispensable minimum surface hardness can be obtained. When the thickness is 80% or less of the mean particle diameter, convex portions formed by the microparticles can have an appropriate shape on the surface of the anti-ultraviolet layer, and the yellow tint can be reduced by an effect of the external haze obtained thereby."

See also applicants' specification, Pub. '017, at paragraph [0056], which discusses the results of the Examples and makes clear the purely physical function and effect of the relationship between layer thickness and mean particle diameter:

"In particular, because the thicknesses of the anti-ultraviolet layers of the surface protective sheets of Examples 1 to 3 were 67%, 80%, and 67% of the mean particle diameter of spherical microparticles, respectively, the yellow tint could further be reduced."

Most especially in light of this last passage, applicants submit that one skilled in the art would consider the range of 66.6-80% inherently supported by the description in the original disclosure. See M.P.E.P. §2163.05, *supra*.

Therefore, applicants further submit that claim 1, and claims 8, 11 and 14 dependent thereon, fully satisfy the written description requirement of §112, first paragraph.

§112, Second Paragraph

Claim 1 (and dependent claims 8, 11 and 14) have been rejected under 35 U.S.C. §112, second paragraph, as being indefinite because "the claim contains the limitation that the content of the ultraviolet absorber is 5 to 15 parts by weight based on 100 parts by weight of the ionizing radiation curable resin composition in the anti-ultraviolet layer, but it is unclear if this weight percentage is for the cured or uncured layer" (Office Action, p. 3).

The present Amendment changes the language of claim 1 from "5 to 15 parts by weight based on" to "5 to 15 parts by weight with respect to 100 parts by weight of the ... resin composition." This revised recital is expressly supported by the disclosure at paragraph [0026] of Pub. '017.

Especially as thus clarified, claim 1 and its dependent claims 8, 11 and 14 are submitted to be properly definite. The recited relationship expresses the relative proportions of absorber and resin in the anti-ultraviolet layer composition. Those relative proportions remain the same regardless of whether the layer itself is cured or uncured, and regardless of whether solvents (in however large a proportion) are or are not present in the composition.

In a previous Office Action dated August 13, 2009, in the subject application, at p. 3, the Examiner stated (discussing a rejection under §112, second paragraph) that "Since the coating mixture can include solvents, the weight percentages for the cured and uncured composition would be different." The response to Arguments at p. 7 in the current Office Action addresses applicants' previous argument that paragraph [0038] of Pub. 017, "in teaching that a 'coating solution ... was applied, dried, and irradiated with ultraviolet rays ... to form an anti-ultraviolet layer,' ... distinguishes between 'coating solution,' which is the material before UV curing, and 'anti-ultraviolet layer' which is the layer formed by curing." Noting that paragraph [0038] "finishes with '... having a thickness of 4 μm ...,'" the Response to Arguments contends that "the curing is taught to form a layer with a particular thickness, not that it defines that the anti-ultraviolet layer means only the cured layer."

This observation is plainly inapposite to the recital of proportions of absorber and resin relative to each other in present claim 1, because those *relative* proportions do not change regardless of the presence or absence of solvents or other ingredients. To echo the Office Action (at p. 4, lines 17-19, discussing the disclosure of Onozawa et al.), "Since, as shown in the Examples, the solvents, which would be removed during curing, are listed separately from the resin, the weight ratios would be those of the cured composition." See applicants' Examples in Pub. '017 at [0038] - [0039] (resin composition solid content is 100%; solvents listed separately from resin).

More broadly, it would be apparent to a person skilled in the art (to whom the disclosure is directed under §112) from applicants' specification as a whole, that the descriptions of

proportions and percentages of components of the anti-ultraviolet layer therein use the term "anti-ultraviolet layer" to refer to the layer after the coating solution has been applied and dried to remove the solvent. See, for example, paragraph [0055] of Pub. '017, which says that "the anti-ultraviolet layers of ... Examples 1 to 4 ... contained 0.4 to 3% by weight of the microparticles." The ingredients listed for the "coating solution for anti-ultraviolet layer" in Example 1 at paragraph [0038], including solvents as well as microparticles, contained 0.17% by weight of microparticles (much less than 0.4%), but the same ingredients without solvents contained 0.8% by weight of microparticles (between 0.4 and 3%). The similar list for Example 2 at paragraph [0039], again including solvents, contained 0.28% by weight of microparticles (less than 0.4%) but without solvents contained 1.3% by weight of microparticles (between 0.4 and 3%). Thus, "anti-ultraviolet layer" in paragraph [0055] clearly refers to the layer after solvent removal. The same is true of paragraph [0057], which states that the organopolysiloxane content "in the anti-ultraviolet layers" was 0.55% by weight, whereas in Examples 1 and 2 (paragraphs [0038] and [0039]) the organopolysiloxane content of the coating solutions for the anti-ultraviolet layers was about 0.11% by weight.

Since the specification expresses amounts of ingredients in Examples as percentages by weight of the anti-ultraviolet layer after solvent removal, there is no indefiniteness or uncertainty in (or lack of support in the written description for) the recitals of weight ratios or percentages in present claim 1, whether or not the claim sets forth that these are ranges or values in the anti-ultraviolet layer "when the layer has been cured."

Claim Rejections – 35 U.S.C. §103(a)

Claims 1, 8, 11 and 14 have been rejected under 35 U.S.C. §103(a) as unpatentable over U.S. patent No. 6,103,370 (Onozawa et al.) in view of patent application publication No. US 2003/0085284 (Nakamura et al.) and CIBA® product literature for "TINUVIN® 328," "CHIMASSORB® 81" and "TINUVIN® 1130" ultraviolet absorbers.

With reference to this ground of rejection, it may initially be noted that applicants' claimed invention is directed to a surface protective sheet exhibiting superior anti-ultraviolet property and little yellow tint. The problem of yellow tint has heretofore been encountered in

surface protective sheets having an ultraviolet absorber (Pub. '017 at [0005]). Applicants' invention advantageously reduces yellow tint in an anti-ultraviolet layer containing an ultraviolet absorber by including, in that layer, 0.01-1 wt.% of an organopolysiloxane and 0.4-3 wt.% of spherical microparticles having a mean particle diameter of 1-20 microns, and by making the thickness of the cured layer equal to 66.6-80% of the mean particle diameter. As the specification explains,

"when the [ultraviolet layer] thickness is 80% or less of the mean particle diameter, convex portions formed by the microparticles can have an appropriate shape on the surface of the anti-ultraviolet layer, and the yellow tint can be reduced by an effect of the external haze obtained thereby,"

and "by adding 0.01% by weight or more of an organopolysiloxane, the yellow tint can be further reduced" (Pub. '017 at [0031] and [0030]).

The effect of the combination of organopolysiloxane and spherical microparticles having the claimed relationship of mean particle diameter to anti-ultraviolet layer thickness is shown by the Examples and Comparative Examples in applicants' specification (Pub. '017 at [0037]-[0059]). Pertinent data are as follows:

<u>Example</u>	anti-UV layer thickness as % of particle <u>diameter</u>	organopoly- siloxane in anti-UV layer <u>% by wt.</u>	yellow tint (b* <u>value</u>)
Ex. 1	66.7%	0.55 wt.%	1.60
Ex. 2	80.0%	0.55 wt.%	1.63
Ex. 3	66.7%	none	1.65
Ex. 4	88.9%	0.55 wt.%	1.66
Comp. Ex. 1	no particles	none	1.77
Comp. Ex. 2	non-spherical	none	1.68
Comp. Ex. 3	1200 %	none	1.69

In these data, the lower the b* value, the less is the yellow tint.

It will be seen that the Examples (1, 2) in which the anti-ultraviolet layer contained an organopolysiloxane within the claimed range, and had a thickness (after curing) equal to 66.7-80% of the mean particle diameter of spherical microparticles also contained in the same layer,

exhibited superior reduction in yellow tint as compared to all the other Examples (3, 4) and the Comparative Examples.

Neither Onozawa et al. nor Nakamura et al. even mentions the problem of yellow tint, let alone suggests any way to reduce it in an anti-ultraviolet layer. In particular, no matter how the two references may be considered together, they provide no indication that the yellow tint could be reduced by a combination of the two features of presence of organopolysiloxane and percentage relationship between layer thickness and mean particle diameter. Being entirely unconcerned with the yellow tint problem, the references do not intimate that either or both of these features could ameliorate it.

The Office Action asserts (pp. 7-8) that the failure of the references to mention the problem of yellow tint does not negate the obviousness of using "the size and shape anti-glare particles of Nakamura, as the anti-glare particles of Onozawa" and "having the matting particle size larger than the layer thickness" as Nakamura et al. teaches (see the Office Action at pp. 5-6), because "the motivation to amend Onozawa was to form an anti-glare layer having a consistent anti-glare property with a sufficient degree of anti-glare behavior" and "the features upon which applicant relies are not recited in the rejected claim(s)."

Applicants' present claim 1, however, recites a combination of all of the following features in an anti-ultraviolet layer of a surface protective sheet:

- 5 to 15 parts by weight of an ultraviolet absorber having a formula weight of 200 to 400 with respect to 100 parts by weight of the ionizing curable resin composition of the anti-ultraviolet layer;
- 0.4 to 3 wt.% of spherical microparticles having a mean particle diameter of 1 to 20 microns;
- a cured layer thickness equal to 66.6 to 80% of the mean particle diameter; and
- 0.01 to 1 wt.% of organopolysiloxane.

As applicants' Examples and Comparative Examples demonstrate, the feature of "preventing tint change" (reducing yellow tint) is inherent in an anti-ultraviolet layer containing the stated ranges of ultraviolet absorber, spherical microparticles of the defined size, and organopolysiloxane, and having the defined relationship of layer thickness to mean particle diameter. An express recital of an inherent property is not necessary to give weight to that property in determining

patentability.

Moreover, neither the "coat" layer of Onozawa et al. nor the anti-glare layer of Nakamura et al. contains 5 to 15 parts by weight of ultraviolet absorber per 100 parts by weight of the layer resin composition. Nakamura et al. does not disclose the presence of *any* ultraviolet absorber in the anti-glare layer, but merely mentions "a UV absorber" (at paragraph [0035]) as one among a number of additives for the *transparent support*, which is different from the anti-glare layer, is indeed spaced from the anti-glare layer by a hard coat layer, and contains no spherical microparticles. Onozawa et al. (at col. 3, lines 45-46) lists an unquantified and unspecified "ultraviolet absorbent" as one among a number of optional additives to the coat layer; the only disclosures of proportions or identity of the ultraviolet absorber are in some of the Examples of Onozawa et al., which include 1 to 1.5 parts by weight of "TINUVIN® 1130" ultraviolet absorbent per 100 parts by weight of resin. "TINUVIN® 1130" ultraviolet absorbent has a formula weight of 637, above applicants' claimed upper limit of 400.

The Office Action (p. 5) contends that Onozawa et al. "does not preclude using a different ultraviolet absorber or different loadings," and cites CIBA® product literature for "TINUVIN® 328" and "CHIMASSORB® 81" ultraviolet absorbers as showing ultraviolet absorbers, within applicants' claimed 200-400 formula weight range, which have lower UV transmittances than "TINUVIN® 1130" ultraviolet absorber. The asserted motivation for substituting "TINUVIN® 328" or "CHIMASSORB® 81" for "TINUVIN® 1130" ultraviolet absorber in the Onozawa et al. coat layer is "to use a more effective ultraviolet absorber" (Office Action, p. 8). Further, the Examiner remarks that the product literature teaches that "the amount ... required for optimum performance should be determined in trials covering a concentration range," and argues (p. 6) that "Thus, the amount of absorber would be a results [*sic*] effective variable."

The CIBA® product literature for each of the ultraviolet absorbers in question, however, teaches "Recommended concentrations" of 1.0-3.0% by weight "based on weight percent binder solids." These ranges embrace the concentrations of "TINUVIN® 1130" ultraviolet absorber already given in the Onozawa et al. examples and are below applicants' claimed range of 5-15 parts by weight per 100 parts by weight of resin composition. Consequently, even if it could be said to be obvious to substitute "TINUVIN® 328" or "CHIMASSORB® 81" ultraviolet absorber

for the “TINUVIN® 1130” absorber taught by Onozawa et al., any obvious “result effective variable” excursion would be limited to the “Recommended concentration” range of their product literature, which embraces the exemplary values given by Onozawa et al. but is wholly outside applicants’ claimed range of weight ratio of ultraviolet absorber to resin.

In addition, the Office Action (p. 5) expressly sets forth that the assertedly obvious modification of Onozawa et al. in view of Nakamura et al. is to use the anti-glare particles of Nakamura et al. as the anti-glare particles (“filler”) of Onozawa et al. While Onozawa et al. states (col. 3, lines 19-28) that “Any of fillers such as silica ... may be contained in the resin composition to provide an anti-glare property” in an amount of “0.5 to 50 parts by weight based on 100 parts by weight of the multifunctional acrylate,” the filler (like the ultraviolet absorbent) is an optional ingredient in the coat layer, and there is no teaching to use these two optional ingredients together in the same coat layer. The only Example of Onozawa et al. that contains any filler is Example 8 (col. 7, line 41 – col. 8, line 5), which contains no ultraviolet absorbent. Substitution of the Nakamura et al. matting agent particles for the filler in Onozawa et al. Example 8, therefore, could not result in a layer containing both spherical microparticles and ultraviolet absorber as applicants’ claim 1 requires.

Further, in asserting that Onozawa et al. teaches 0.1 to 100 parts by weight of organopolysiloxane based on 100 parts by weight of the acrylate resin, the Office Action (p. 6) cites col. 2, lines 35-62, in the patent. This passage gives examples of the radiation-curing silicone resin that is combined with a multi-functional acrylate in the coat layer of Onozawa et al. (see col. 1, lines 44-50). Assuming *arguendo* that the listed examples include organopolysiloxanes (see col. 2, lines 44-54), the amount of radiation-curing silicone resin present in Onozawa et al. Example 8 is 40 parts by weight per 100 parts by weight of triacrylate. Hence, if the microparticles of Nakamura et al. were to be substituted for the filler of Onozawa et al. Example 8, the result would not be a combination of such microparticles with 0.01-1% of organopolysiloxane in an anti-ultraviolet layer as present claim 1 requires.

The point is that merely substituting the Nakamura et al. microparticles (spherical, and “larger than the layer thickness”) for the filler of Onozawa et al. in the coat layer of the latter patent, and merely substituting the ultraviolet absorbers “TINUVIN® 328” or “CHIMASSORB® 81” for the “TINUVIN® 1130” absorber of Onozawa et al., would not

provide or make obvious the specific combination of components, proportions and dimensions recited in applicants' present claim 1, whereby applicants achieve the unexpected and beneficial result of reduced yellow tint in an anti-ultraviolet layer.

It is therefore submitted that the recital of that specific combination distinguishes present claim 1 (and claims 8, 11 and 14 dependent thereon) patentable over Ozonawa et al., Nakamura et al., the cited CIBA® product literature, and any proper combination thereof.¹

For the foregoing reasons, it is believed that this application is now in condition for allowance. Favorable action thereon is accordingly courteously requested.

Respectfully submitted,



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¹ As a matter of information, in applicants' counterpart Japanese patent No. 4,610,929, a claim almost the same as present U.S. claim 1 was allowed over references including the Japanese counterparts of Onozawa et al. (JP 11-29720 A) and Nakamura et al. (JP 2002-202402 A). A copy of pages from the Japanese Patent Official Gazette showing the allowed claims of JP 4,610,929 and listing the cited references is attached hereto as EXHIBIT 1.

EXHIBIT 1

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(54) 【発明の名称】 表面保護シート

Allowed Claims.

(57) 【特許請求の範囲】

【請求項1】

プラスチックフィルムの少なくとも一方の面に紫外線防止層を有する表面保護シートであって、

前記紫外線防止層は、電離放射線硬化型樹脂組成物、式量200～400のベンゾトリアゾール系の紫外線吸収剤、平均粒子径が1 μm～20 μmの球形微粒子、およびオルガノポリシロキサンから形成されてなり、

前記微粒子は紫外線防止層において0.4重量%～3重量%含有され、前記紫外線吸収剤は前記紫外線防止層のバインダー成分100重量部に対して1～20重量部含有されてなり、前記紫外線防止層の厚みは、前記微粒子の平均粒子径に対し66.6%～80%であり、前記オルガノポリシロキサンは前記紫外線防止層において0.01重量%～1重量%含有されることを特徴とする表面保護シート。

【発明の詳細な説明】

【技術分野】

【0001】

本発明は、案内板、広告、看板、標識、ポスター、表札、銘板等の表示物の表面を保護するのに好適な表面保護シートに関する。

【背景技術】

【0002】

従来、案内板、広告、看板、標識等の表示物の表面を保護するために表面保護シートが

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特開2003-011281 (J P, A)

特開2004-130540 (J P, A)

1st reference

2nd reference.

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